

NAVAL MEDICAL RESEARCH AND DEVELOPMENT NEWS

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Navy Researchers Participate in the World Malaria Day Event on Capitol Hill

SILVER SPRING, Md. - To commemorate World Malaria Day, April 25, the Senate Caucus on Malaria and Neglected Tropical Diseases hosted a luncheon and panel discussion on Capitol Hill for representatives from U.S. industry and academia, government agencies and impacted countries to highlight the importance of U.S. partnerships in the global fight against malaria.

The theme of the 2013 World Malaria Day was "Invest in the Future: Defeat Malaria."

It is a day to celebrate hard-earned successes and raise awareness of the investments still needed to fight this life-threatening disease that puts more than half of the world's population at risk.

"This was a great opportunity for Navy Medicine to highlight the work we are doing in advancing a malaria vaccine to protect the deployed warfighter

and also to support global public health initiatives," said Dr. Kevin Porter, the director of infectious diseases research at the Naval Medical Research Center (NMRC). "I am grateful to Dr. Karen A. Goraeski, executive director, American Society of Tropical Medicine and Hygiene, who moderated the panel discussion, for acknowledging the important role the Department of Defense has played and continues to play in this global fight against malaria from the drug and vaccine development perspective."

Panel member Dr. Sarah Volkman, principal research scientist, Department of Immunology and Infectious Diseases, Harvard School of Public Health, echoed Goraeski's comments in praising DoD research, and she added, "We can now imagine a world without malaria."

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NMRC malaria researchers Cmdr. David Fryauff (left) and Cmdr. Cindy Tamminga (second from left) and Dr. Kevin Porter (far right), director of the Infectious Diseases Directorate, speak with attendees during the Senate Caucus on Malaria and Neglected Tropical Diseases luncheon and panel discussion. Photo by Doris Ryan.

NMRC Commanding Officer's Message

With every newsletter we are able to draw attention to some of the ongoing projects or recent accomplishments throughout the eight commands of Navy Medical R&D. I am invariably impressed by the quality of the people and the importance of the work. We have recognized experts and cutting-edge programs in critically important areas such as infectious diseases, toxicology, and regenerative medicine, and our research is responsive to the recognized needs of our warfighters, beneficiaries, and partners.

For example, Traumatic Brain Injury (TBI) and Post-Traumatic Stress Disorder (PTSD) have often been called the signature wounds of the Iraq and Afghanistan wars. NMRC's researchers have developed a novel research capability focused on blast biophysics and physiology to characterize injuries following blast exposure. NHRC researchers have been leading the way in studying behavioral trends impacting warfighter readiness and the identification and development of treatment modalities that minimize PTSD.

There is still much work to be done in these important areas, but I have little doubt that the work being conducted today will contribute to the health of our warfighters for years to come. Thank you for your expertise and your dedication to the mission..

NMRC Commanding Officer sends,
John W. Sanders III
CAPT, MC, USN



NMRC Executive Officer's Message



What science are you working on today? What will they say about your research in the years to come? As the years pass, fewer people remember when NMRC was the Naval Medical Research Institute (NMRI) located in Building 17 on the Bethesda campus. The majority of the current staff probably don't know that the Behnke Auditorium here in building 503 was named in honor of NMRI's founding father!

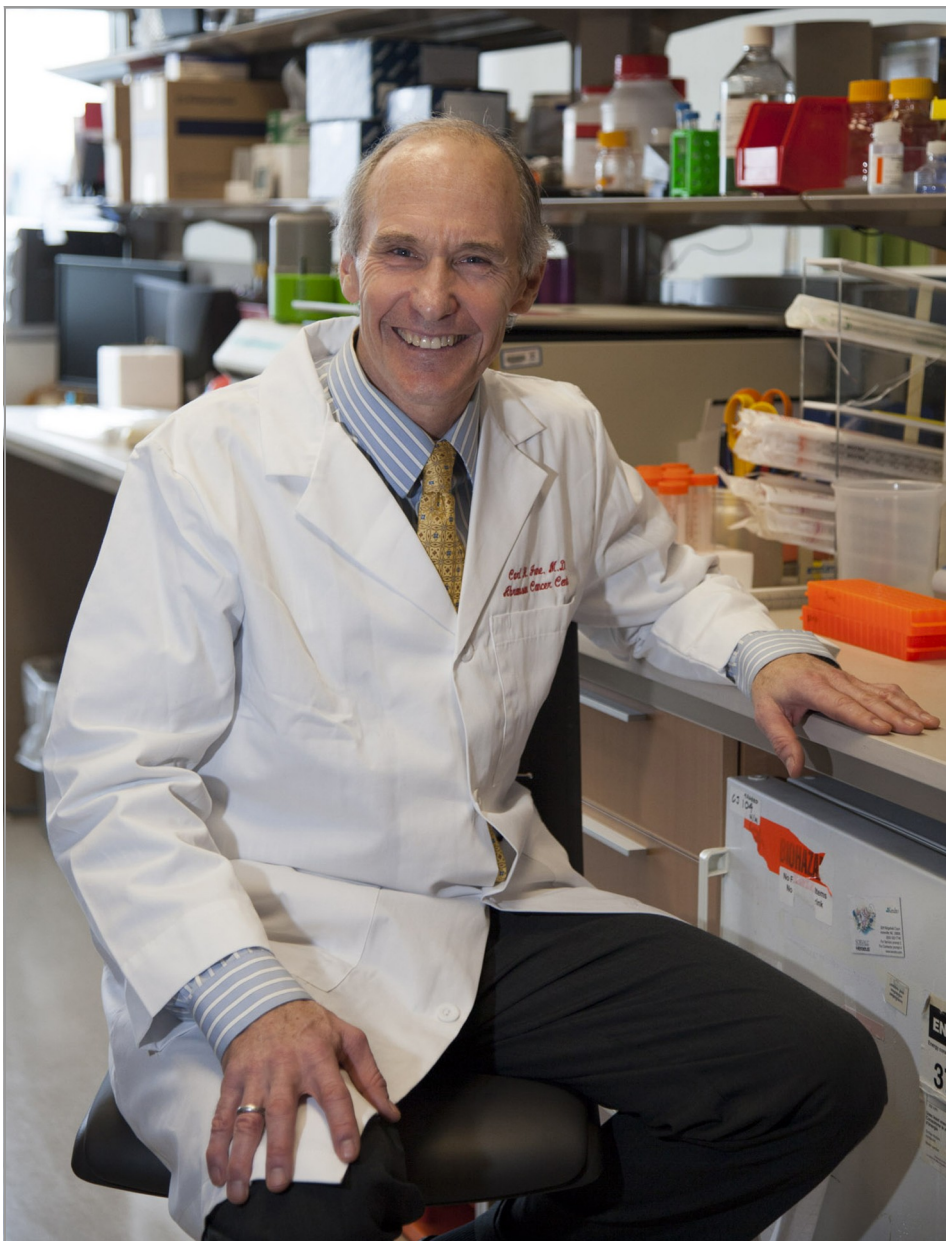
NMRI was commissioned on Navy Day, October 27, 1942. The scientific staff consisted of 13 officers. In July 1943, Capt. A.R. Behnke, MC, USN, was assigned as research executive. He began to outline his idea for a medical laboratory modeled after the Harvard Fatigue Lab. NMRI was organized into four departments: environmental medicine, naval preventive medicine, equipment research, and dental research. By that time, the staff increased to 39 officers; nine were WAVES (Women Accepted for Volunteer Emergency Service, a World War II-era division of the U.S. Navy that consisted entirely of women). Behnke remained at NMRI until 1950. Research efforts during the early years at NMRI were quite varied: water and food for shipwrecked personnel; sunburn prevention; protection against blast injuries; blood substitutes; aviation medicine; dental research; therapy of malaria, including the synthesis and testing of new compounds to cure malaria; and of course Behnke's areas, submarine and diving medicine.

Some pretty important people passed through the halls of NMRI. For example, Charles Lindbergh in 1968 accepted a guest scientist appointment to work on whole organ perfusion. During the 1950s and 1960s, the institute became involved in training monkeys, and later human astronauts, for space flight. John Glenn, Wally Schirra, Scott Carpenter, Alan Shepard and Gus Grissom walked the halls of NMRI.

The Navy Tissue Bank was established at NMRI, developing freeze-drying techniques to preserve tissue for grafting and other reconstructive surgery. During the Vietnam War, thousands of wounded soldiers were treated with tissue collected, preserved and shipped from the Navy Tissue Bank. In 1995, a space shuttle Discovery payload included an experiment developed by NMRI Immune Cell Biology Program scientists investigating the growth and development of bone marrow stem cells. That same year the Endeavor included a second set of experiments developed by NMRI scientists.

NMRC Executive Officer sends,
Elizabeth Montcalm-Smith
CAPT, MSC, USN

Former Navy Researcher Honored with the Philadelphia Award



Dr. Carl H. June, recipient of the Philadelphia Award, in a laboratory at the University of Pennsylvania. A former Navy researcher, June developed the foundation from which arose the Immune Cell Biology Program at the Naval Medical Research Institute in the 1990s.

By Cmdr. Patrick J. Blair, Naval Medical Research Center

PHILADELPHIA - Retired Navy Captain Dr. Carl H. June has been honored with the *Philadelphia Award* for his extraordinary advancements in gene therapy aimed at treating HIV and cancer. June is currently the Richard W. Vague Professor in Immuno-

therapy, Department of Pathology and Laboratory Medicine in the Perelman School of Medicine and Director of Translational Research at the Abramson Cancer Center, University of Pennsylvania.

That June was at the forefront of this work comes as no surprise to friends and colleagues who have witnessed a career marked by brilliance

and unbridled intensity. His work ethic was evident by the time he graduated in biology/pre-medicine from the U.S. Naval Academy in 1975 and then the Baylor School of Medicine in 1979. Honing his research skills under the tutorship of Dr. Paul-Henri Lambert at the World Health Organization, Geneva, Switzerland, and then training in transplantation biology at the Fred Hutchinson Cancer Research Center in Seattle in the early 1980s, June developed a foundation from which arose the Immune Cell Biology Program at the Naval Medical Research Institute (NMRI) in the 1990s.

Over a twenty-year career with the Navy, June studied the triggers in lymphocytes that augment or suppress the immune response, then developed novel therapies for bone marrow transplantation, autoimmune diseases and treatment of individuals with HIV. In 1996, June was awarded the Office of Naval Research's highest recognition for scientific achievement, the Dexter Conrad Award. He and Capt. David M. Harlan were co-awarded the Frank Brown Berry Prize for top achievement in federal medicine in 1997.

There was no time to reflect. In 1996, June's wife, Cynthia, was diagnosed with ovarian cancer. Her illness served as the impetus for the plans for a translational research center where investigators and clinicians could push novel cancer and infectious disease therapies from the bench to the bedside. The Abramson Cancer Center at the University of Pennsylvania provided the opportunity to June and in 1999 he departed Bethesda for Philadelphia.

Over the next twelve years, "the June Laboratory" focused studies to assess various mechanisms of lymphocyte activation that relate to immune tolerance and adoptive immunotherapy. Reminders of the importance of this work have always been present. His oldest daughter Sarah's battle with juvenile idiopathic arthritis. The death from pancreatic cancer of Dr. Richard G. Carroll, an investigator
([Continued](#) on page 9)

NAMRU-3 Researchers Collaborate on Dengue Prevention

CAIRO – The U.S. Naval Medical Research Unit No. 3 ([NAMRU-3](#)) initiated a new project for efficient and sustained control of dengue vectors in Lahore, Pakistan. The emergence of dengue and dengue hemorrhagic fever is considered a major public health threat there. Under a Department of State-funded project, NAMRU-3 and the University of Veterinary and Animal Sciences (UVAS) in Lahore began a collaborative relationship to establish a vector management lab at its Quality Operations Lab. Once established, prevention efforts will focus on implementation of early disease detection through promoting the core functions of regular vector surveillance, viral diagnosis in vector samples and control programs.

The first phase of this capacity-building project began with a visit to UVAS in late 2012 to evaluate the current laboratory and conduct a laboratory risk assessment. Noha Watany of NAMRU-3's Vector Biology Research Program (VBRP), the lead collaborator on the project, conducted



From left: Reham Tageldin, NAMRU-3, conducting training for Dr. Zarfashan Tahir, Prof. Dr. Kamran Ashraf, Nadia Mukhtar, and Prof. Dr. Tahir Yaqub on mosquito identification. Photos by Rafi George.

the four-day lab assessment. During the visit, Dr. Tahir Yaqub, director of the Quality Operations Lab at UVAS, allocated one floor for the vector management lab.

Established in 1882, UVAS is one of the oldest veterinary institutions in

Asia. Its staff of highly specialized molecular biologists lacked specific training in mosquito identification, habitat, bionomics, general characteristics identification, use of a specific identification key, and how to handle insects for pathogen detection.

In April, VBRP conducted training geared to meet the identified needs of this project. Yaqub, along with three other researchers, attended this training.

"This training specifically addressed the needs of our lab, and even though I am a professor, the way in which the training was presented made it extremely beneficial for all of us," Yaqub said.

Three additional researchers are scheduled to receive training at NAMRU-3 on biosafety and biosecurity and mosquito identification.

The next phase of the project is providing and installing the needed equipment to set up a vector management laboratory at UVAS and put into practice what the trainees learned at NAMRU-3.

"Supporting the reduction of vector-borne diseases will impact public health, which is critical in achieving regional health security," said NAMRU-3 Commanding Officer Capt. Buhari Oyoyo.



From left: Nadia Mukhtare, UVAS; Prof. Dr. Kamran Ashraf, UVAS; Nermeen Fahmy, NAMRU-3; and Prof. Dr. Tahir Yaqub, director, Quality Operations Lab, UVAS. Fahmy is providing training on molecular detection of dengue virus in mosquito samples.

NAMRU-Dayton Doubles Capacity to Perform Fuel Inhalation Studies

By Arden James and Dr. Karen Mumy

DAYTON, Ohio – In order to keep pace with the rapidly advancing field of alternative and bio-based fuels, the Naval Medical Research Unit Dayton's (NAMRU-D) Environmental Health Effects Research Directorate has recently doubled its capability for performing fuel inhalation studies.

The new inhalation chambers are currently being prepped to begin an inhalation study of an Alcohol-to-Jet fuel under consideration for use by the Navy, Air Force and Army. This 90-day study, due to start in the late spring of 2013, is a tri-service effort and will be closely monitored by the Tri-Service Alternative Fuels Team.

NAMRU-D has historically been the "go-to" laboratory for evaluating inhalation health risks associated with fuel exposure for many DoD fuel needs. More recently, with the Navy, Air Force and Army looking to transition to renew-
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NAMRU-D's inhalation chambers. New chambers are being prepped to begin a 90-day study this spring.

Navy Collaboration Finds Predictors of Dengue Disease Severity



Dr. Peifang Sun, NMRC researcher, studies dengue diseases.

SILVER SPRING, Md. - Dengue is a disease that is high on the list of mosquito-transmitted disease threats that can severely cripple military operations in tropical and subtropical regions of the world. Nearly one-third of the world population lives in dengue-affected area.

Dengue diseases range from dengue fever (DF), dengue hemorrhagic fever (DHF) and lethal dengue shock syndrome (DSS). DF, DHF and DSS all start as a febrile disease with no clearly distinguishable features from one another. The signs of DHF and DSS are more detectable around day three or four of the fever. Patients with DHF and DSS show signs of bleeding, loss of platelets, plasma leakage, and low blood pressure.

Choices for treatment for DHF and DSS include fluid administration and blood transfusion, but what to give patients and when rely on disease classification. The World Health Organization published guidelines for dengue

disease classification that rely largely on clinical symptoms and hematological tests. There is no biological laboratory test for early diagnosis of DHF and DSS.

Dr. Peifang Sun, along with other researchers, took a gene array approach to study the immune responses in dengue patients from Maracay, Venezuela, to seek early diagnostic markers for severe dengue disease. The study was led by Lt. Cmdr. Tad Kochel with collaborations from scientists from Laboratorio Regional de Diagnóstico e Investigación del Dengue y Otras Enfermedades Virales, Instituto de Investigaciones Biomédicas de la Universidad de Carabobo, Maracay, Venezuela, and the U.S. Naval Medical Research Unit No. 6, Lima, Peru. Together, the researchers found a set of seven gene markers differentially expressed in DF and DHF patients as early as day one of the fever, which predicted dengue disease severity with high accuracy.

NMRC Researcher Invited Keynote Speaker at Tuskegee University

SILVER SPRING, Md. – Cmdr. Charmagne Beckett, director of [NMRC](#)'s Translational Research Office, was a keynote speaker at historic Tuskegee University. Her presentation on "Ethics and Research" was the final session of the second annual Public Health Ethics Intensive (PHEI) course. Hosted by Tuskegee University National Center for Bioethics in Research and Health Care, the three-day PHEI course is designed for a trans-disciplinary group of scholars, researchers, policy officials, community advocates and students. The course focuses on bioethics, public health ethics and health disparity issues related to social justice.

At the course, Beckett's lecture highlighted Navy Medicine's commitment to high moral character and ethical standards in conducting research, especially involving humans. She shared her experiences and career development in conducting research within military settings and at overseas remote locations. Her lecture respondents were Derrick Tabor, Ph.D., a program director at the National Institute on Minority Health and Disparities, Center of Excellence (National Institutes of Health-Bethesda), and Shelley Brown, Ph.D., trained in biomedical engineering and currently pursuing a master's degree at Harvard Divinity School.

The Bioethics Center was established May 16, 1997, as part of the Presidential Apology given by President Clinton to the six remaining participants and the families of the over 600 deceased participants of the U.S. Public Health Service Syphilis Study conducted in Macon County, Alabama. Well known as the Tuskegee Syphilis Study, it marks one of the most egregious investigations



From left: Dr. Derrick Tabor (NIH), Cmdr. Charmagne Beckett, MC, USN (NMRC), and Dr. Shelley Brown (Harvard).

in human subject research and health care. By executive order, President Clinton mandated that the Department of Health and Human Services fund Tuskegee University to establish a bioethics center to prevent these types of abuses from ever happening again. Since official opening of the Bioethics Center in 1999, an annual commemoration of the apology is held on the campus of Tuskegee University.

Former Navy Researcher Honored with the Philadelphia Award

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in the laboratory. Over the years, work evolved into pre-clinical and clinical trials to combat HIV, non-small cell lung cancer, leukemia, ovarian and pancreatic cancer. In August 2012, a year after his team published the promising results of the first three CLL patients treated with the modified T cell approach (two of whom remain in remission more than 30 months later), the University of Pennsylvania formed an alliance to expand the use of personalized T cell therapy for cancer patients with the pharmaceutical company Novartis Inc.

When asked about the recent *New England Journal of Medicine* paper on this work, June commented, "We're hopeful that our efforts to treat patients with these personalized cellular thera-

pies will reduce or even replace the need for bone marrow transplants, which carry a high mortality risk and require long hospitalizations."

The research is still in its early stages, and questions remain. In a New York Times interview in December 2012, June stated, "Our goal is to have a cure, but we can't say that word." Yet. But as a result of tireless efforts over the last thirty-three years, June and his network of laboratory and clinical colleagues have brought us far closer than ever before.

The annual Philadelphia Award is given to the person "who best brought to culmination an act or contributed a service calculated to advance the best and largest interest of the community." During the announcement, Board of Trustees Chair Natalye Paquin noted

that June's studies "are historic and may forever change the way physicians treat certain types of cancers around the world."

This follows June's senior-authored publication in the *New England Journal of Medicine* (March 2013 online) reporting that two children with advanced, intractable acute lymphoblastic leukemia, an aggressive form of childhood leukemia, showed complete remission of their disease after treatment with an experimental therapy that utilized engineered T cells to attack cancerous B cells. In December at the annual meeting of the American Society of Hematology, June's team announced that among 10 adults and two children with chronic lymphocytic leukemia, nine demonstrated complete or partial remissions.

NAMRU-3 Researcher Completes Distance Learning in London



Enas Newire performing polymerase chain reaction for genotyping antibiotic resistant strains. Photo by Rafi George.

CAIRO – Enas Newire of the Naval Medical Research Unit No. 3 ([NAMRU-3](#)) Bacterial and Parasitic Disease Program (BPDRP) is back in the lab after completing a four-month study module at University College London as part of her Ph.D. program on antimicrobial resistance molecular characterization. Her research on antimicrobial resistance in Egypt and the data she develops at NAMRU-3 form the basis for her Ph.D. project, making it mutually beneficial to Egypt, NAMRU-3, and Newire.

Recently featured in an article on distance learning in the British newspaper *The Independent*, Newire was named as an ambassador for the University of London, where she is pursuing her Ph.D. She was a natural choice as an ambassador, having already completed a master's degree in infectious diseases at the London School of Hygiene and Tropical Medicine, during which she was the elected student representative for her class. Since becoming ambassador, she has been contacted by people

from the Middle East, Canada and England to discuss distance learning's pros and cons.

Newire said, "I work on my research on a different continent from my college, but I am still able to pursue advanced studies at a world-class college with the financial support of a multinational corporation."

She also credits her ability to pursue her Ph.D. while working at NAMRU-3 because of professional support from her supervisors, and particularly mentorship by the commanding officer, Capt. Buhari Oyoyo, who inspired her to move forward. In turn, she encourages her colleagues to seek guidance and provides ideas on how to pursue advanced degrees.

Newire explained that distance learning and online learning are not always synonymous. It is possible to do distance learning without any computer connection, as long as materials can be sent and received easily.

She commented, "Online courses are a great way for classmates to communicate and participate in lectures via the computer."

Newire was selected for a scholarship that she learned about from one of her undergraduate professors at the American University in Cairo. Offered by a multinational corporation, its goal is to encourage women in developing countries and emerging economies to pursue advanced studies. She should return to London later in the year for the next resident module.

NAMRU-Dayton, Air Force Host Tri-Service Toxicology Consortium

By Dr. Michael L. Gorgas

DAYTON, Ohio – The Naval Medical Research Unit Dayton ([NAMRU-D](#)) and the Air Force 711th Human Performance Wing hosted a gathering of the Tri-Service Toxicology Consortium (TSTC) at Wright-Patterson Air Force Base.

Forty-three scientists attended on-site or via Defense Connect Online.

Toxicology research organizations representing the Army, Navy and Air Force were present, with additional representatives from the Veteran's Administration and the Deputy Under Secretary of Defense for Installations and Environment (OSD-I&E).

One topic of tri-service interest was lead contamination at Department of Defense firing ranges. The OSD-I&E has tasked the TSTC to evaluate a

recent report by the National Academy of Sciences that indicated the existing Occupational Safety and Health Administration acceptable blood lead level is no longer health protective.

The TSTC members will determine a more suitable acceptable blood lead level and explore ways to derive and recommend appropriate air lead standards and action for DoD personnel at firing ranges.

Navy Researcher Supports Capacity Building in Rural Indian Villages

SILVER SPRING, Md. - Dr. Wei Mei Ching, a senior scientist and principal investigator in the Naval Medical Research Center's (NMRC) Viral and Rickettsial Diseases Department, continues to be a trailblazer to young scientists around the world. Ching taught a course at the Christian Medical College in Vellore, India to fifteen graduate students as part of their master of science degree training. This particular type of training is not regularly available to the students studying microbiology. The course provided them an opportunity to conduct quality research and improve their diagnostic capabilities.

"These students are expected to take the knowledge they've learned back to their remote villages in India to improve the capability in clinical diagnosis of microbiology," said Ching.

Ching delivered a series of lectures on the utility of tools in evaluating po-

tential diagnostic assays using scrub typhus as an example.

"I had the opportunity to share with the students the latest developments for the rapid detection of zoonotic diseases, which are emerging and re-emerging in many different geographic areas," Ching said. She added that often the diseases are neglected and underdiagnosed due to the lack of good diagnostic tools, and physicians tend to categorize them as a "fever of unknown origin" when a patient comes in with undiagnosed symptoms.

Ching shared different ways to identify the specific cause of zoonotic diseases that may not be initially recognized in order to provide guidance for clinicians to prescribe the correct antibiotic for patient management. She also led discussions to initiate and finalize clinical research protocols for the validation of various zoonotic diseases as-

says in endemic areas.

According to Ching, such zoonotic diseases do not exist in the U.S., so they are not of public interest, but there is a military interest. Scrub typhus has a major impact on military operations in endemic areas. Therefore, the research being conducted at NMRC has to be at the forefront of the latest advancements since the Navy's primary mission is to enable readiness, wellness and health of the warfighter.

For Ching, it was a rewarding experience being able to provide training to young students just like her summer interns at NMRC.

"When people learn from me and they understand, that makes me happy," she said.

Ching was sponsored by the American Society for Microbiology Indo-U.S. Science and Technology Forum Professorship Program in Microbiology.



Dr. Wei Mei Ching (front center) with officials (front row) and students at the Christian Medical College in Vellore, India.

NAMRU-Dayton Doubles Capacity to Perform Fuel Inhalation Studies

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able fuels, NAMRU-D was faced with the need to evaluate multiple fuels with overlapping time frames. In order to meet DoD needs, and in collaboration with the Air Force, NAMRU-D increased the number of fuel inhalation chambers from four to eight to accom-

modate testing two fuels at the same time.

Typically, laboratory models are exposed to three concentrations of jet fuel test atmospheres to evaluate the toxicity and health effects associated with respiratory exposure. Inhalation test atmospheres are created to simulate

in-theater conditions that military personnel experience. These systems are automated to control the test atmospheres to within five percent to within test article target concentrations. In addition, specialized equipment is used to verify that the test atmospheres are stable for the length of the exposure.

WRNMMC Military Physicians Receive Annual Research Awards

By Bernard S. Little, WRNMMC
Journal Staff Writer

BETHESDA, Md. - Six physicians at Walter Reed Bethesda recently earned top research awards for their work to improve patient care.

Navy Cmdr. Kevin O'Meara, Air Force Maj. Candace Percival, Army Maj. Micah Hill, Army Capt. Ashleigh Pavey, Army Capt. Elizabeth Polfer, and Army Capt. Ryan Walk earned awards in the Robert A. Phillips (RAP) and Bailey K. Ashford (BKA) research competitions. They presented their works during the Research and Innovation Week symposium, April 19.

The RAP Award recognizes research excellence from all researchers (both military and Department of Defense civilians) at the resident and staff/fellow level. The award is named for the Navy officer and researcher noted for his work helping cholera victims, establishing Navy Medical Research Units globally, and developing an oral lavage process described by medical caregivers as a highly effective glucose-based treatment that has saved millions of lives annually.

The BKA Clinical Research Award was established through the efforts of Col. Marcel E. Conrad, the first chief of Clinical Investigation at the former Walter Reed Army Medical Center (WRAMC). The award is named in honor of the Army physician whose research is credited with helping to solve the problem of hookworm-induced anemia in Puerto Rico during the early 1900s. The Department of Clinical Investigation added the laboratory component to the BKA Research Awards in 1996. The awards are intended to promote a lifelong commitment to advancing military health care, according to officials in the Department of Research Programs at Walter Reed Bethesda.

Polfer, an orthopaedic surgery research fellow, earned the RAP laboratory resident award for developing a model of heterotopic ossification (HO), an aberrant formation of mature lamellar bone in non-osseous (bone)



Front row, second from right: Army Capt. Elizabeth Polfer, an orthopaedic surgery resident at the Walter Reed National Military Medicine Center in Bethesda, is doing an internship in the Regenerative Medicine Department at the [Naval Medical Research Center](#). Polfer earned the Robert A. Phillips Resident Research Award. Photo provided by Bernard S. Little.

material such as muscle.

"There have been two large studies out of this institution looking at the prevalence of HO in our combat wounded which demonstrated a prevalence of about 65 percent among amputees and extremity trauma. HO can result in symptoms of pain, ulceration, regression with physical therapy, decreased range of motion and neurovascular entrapment," Polfer said.

"Currently, there are no feasible means for primary prophylaxis [treatment], and if the patients do not respond to non-operative therapy (adjustment of activity, pain medications, prosthetics, sockets), then the only treatment option left is surgical excision," she added. "The purpose of this research is to develop a model similar in injury to what our combat wounded experience so we can then use the model to test traditional and new means of primary prophylaxis as well as other treatment options. Ultimately, we want to decrease the disease burden of HO on our wounded warriors."

O'Meara, a pediatric gastroenterology and nutrition fellow, earned the RAP laboratory fellow/staff award.

"I have done basic lab research to understand the immune system and regeneration of cells in the intestines when they are affected by inflammatory bowel disease (IBD). I hope that as we better understand the beginnings of IBD and how it progresses, we might be able to abort the process in high-risk individuals or modify the disease to be less severe," he explained.

Percival, a pediatric endocrinologist, earned the RAP clinical fellow/staff award.

"I explored the relationship between hormones that are known to affect appetite – leptin and adiponectin – both in overweight and normal-weight adolescents and evaluated how they correlated with allergy signaling pathways and vitamin D," Percival said. "We learned there are important correlations between the allergy pathways of adolescents who have changes in their appetite hormones in

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NHRC, Mayo Clinic Study Immune Response Following Smallpox Vaccination

From NHRC Public Affairs



SAN DIEGO - In collaboration with Dr. Gregory Poland at the Vaccine Research Group at the Mayo Clinic, researchers

from the Naval Health Research Center ([NHRC](#)) are looking at the role human genes have on individual variability of immune responses following smallpox vaccination. Study results evaluating associations between genetics and smallpox vaccine response were published online, April 18, in *Genes and Immunity*.

Throughout 2005-2006 NHRC recruited over 1,300 active-duty volunteers, prior recipients of the

smallpox vaccine (Dryvax®), from among operational forces in the San Diego area. Researchers at the Mayo Clinic employed next-generation sequencing (mRNA-Seq) methods to evaluate peripheral blood cells from smallpox vaccine recipients with the highest and the lowest vaccinia-specific neutralizing antibody titers. Researchers were able to describe the resulting up- and down-regulation of numerous genes relating to immunity and to identify three genes with significantly differential expression among those with high compared to low vaccine antibody response.

Smallpox vaccination remains a key component of U.S. military biodefense strategy against this biothreat agent. Vaccination provides the best countermeasure against naturally occurring and engineered biothreat agents.

Although naturally occurring smallpox eradication was declared in 1980 by the World Health Organization, this pathogen remains a significant biothreat to the global community and significant investments have been made to increase biopreparedness capabilities.

The rapidly expanding field of vaccinomics has revealed that genetic variations play important roles in affecting an individual's innate and adaptive immune responses to a vaccine. Ultimately, new knowledge may identify individual biomarkers of risk and immunity that can assist in optimizing the development of new vaccines, diagnostic tests, and therapeutics to protect humans from smallpox and other infectious disease threats. Such considerations reflect the "individualized medicine" approach.

WRNMMC Military Physicians Receive Annual Research Awards

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the face of obesity and that these seem to be strongly related to vitamin D deficiency. We think this indicates that vitamin D deficiency in overweight and obese adolescents may mediate the increased risk for allergies and asthma.

"This is important because the development of disease processes associated with people who are overweight or obese, particularly allergy and asthma, are not well understood in their pathophysiology," he added. "We are hoping that this project, and follow-on projects, may help to further [illuminate] these important relationships to help improve our understanding and treatment options for patients."

Pavey, a second-year pediatric resident physician, earned the RAP clinical resident award for her research into the risk of adverse birth outcomes in infants born into families with a history of intimate partner violence or domestic abuse.

"I found that infants born in families

with violence are at increased risk for adverse health outcomes," Pavey said. "If we, as medical providers, can identify these families early, we can improve the health outcomes of our military children."

A general surgery chief resident, Walk earned the BKA laboratory award.

"I was involved in studying the [use] of a new device known as 'non-thermal' or 'cold' plasma for cancer treatment," he explained. "Basically, this device combines electricity with helium gas to create a compound that can kill cancer cells." The physician said he used the device to study its ability in treating neuroblastoma, "a common and deadly childhood cancer."

"As it turned out, cold plasma was quite effective in our model," Walk added. "It will take quite a bit of work and time to transition from using this technology [in the lab] to treating cancers in children. Nonetheless, we are hopeful that this might offer a way to effectively treat a cancer that often

carries a poor prognosis when treated with the current standard therapies."

Hill, assistant professor of obstetrics and gynecology at the Uniformed Services University of the Health Sciences and clinical fellow in reproductive endocrinology and infertility at WRB, earned the BKA clinical award.

"We performed a review of seven years of a very unique protocol called 'GnRH antagonist rescue' which we developed for IVF [in vitro fertilization] patients. The protocol helps reduce patients' risk of having a cancelled IVF cycle or developing ovarian hyper stimulation syndrome," the physician explained.

"Our research answered numerous key clinical questions about the protocol and most importantly, demonstrated that it results in excellent live birth rates for IVF in patients at very high risk of ovarian hyper stimulation," Hill added. "This research resulted in several changes to our medical practices which have further reduced the risk of ovarian hyper stimulation syndrome in our patients."

NAMRU-3 Scientists Collaborate with Nigerian Researchers

CAIRO - The U.S. Naval Medical Research Unit No. 3 ([NAMRU-3](#)) welcomed researchers from the Nigerian Calabar Institute of Tropical Disease Research and Prevention (CITDRP) to begin intensive training.

Professor Emmanuel Ezedinachi, director of CITDRP, and Professor Bassey Okon, deputy vice chancellor of Calabar University, along with laboratory technologists Vivian Asiegbu, Obeten Ubi, and Olabisi Oduwole, began the second phase of a one-year Department of State-funded protocol to build human and laboratory capacity at the newly established institute. NAMRU-3's Vector Biology and Bacterial and Parasitic Disease Research Program staff served as trainers.

Ezedinachi commented that he and Bassey were able to observe the training and also familiarize themselves with all the programs at NAMRU-3 in order to know how best to open channels for future collaboration. He also presented a lecture on ongoing research at Calabar University and identified collaborators who may provide links for future research activities.

Training focused on malaria molecular and serology diagnostics, malaria vector identification and detection of *Plasmodium* species within the



Vivian Asiegbu, Calabar University (right) receives training from Ireen Kamal, NAMRU-3 (left) on malaria antigenic marker detection using conventional polymerase chain reaction technique. Photos by Rafi George.

Anopheles mosquito.

Reham Tageldin, who conducted vector training, said, "The Nigerian trainees were extremely eager to learn and, in fact, wanted to know even more than we had planned in our syllabus."

After completing malaria microscopy training in the Parasitology Department with Gamal Okla, lab tech-

nologist Ubi said, "When we go back to Nigeria, we will arrive with a new vision from what we learned here, and we will become the trainers."

Lab technologist Asiegbu, who trained with Ireen Kamal on the use of molecular tools for malaria diagnosis, expressed her excitement that she was able to run some samples on her own and wished that they had more time for additional training.

Drs. Hala Bassally and Hanan Mohammady, the NAMRU-3 principal investigators for this protocol, have already submitted two new GEIS proposals on malaria and vector surveillance in collaboration with CITDRP.

Capt. Buhari Oyofe, NAMRU-3 commanding officer, said, "We hope to link Nigeria with work done in Liberia and Ghana to enhance capacity engagement in West Africa." He would like to encourage collaborative efforts with the NAMRU-3 detachment in Accra, Ghana and also mentioned that the proximity of the institute to the detachment in Ghana will facilitate collaborative efforts.

At the end of the successful visit, Emmanuel said, "The mustard seed has been successfully sown. We only need to nurture it to grow."



*From left: Obeten Ubi, Calabar University; Reham Tageldin, NAMRU-3; and Olabisi Oduwole, Calabar University. Tageldin provided training on *Anopheles* mosquito identification.*

Navy Researchers Participate in World Malaria Day Event

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The panelists discussed several exciting new research initiatives ranging from innovative drug combinations to new diagnostic tools that could help clinicians detect and track drug resistance in malaria patients.

Cmdr. Cindy Tamminga and Cmdr. David Fryauff, malaria researchers from the Malaria Program at NMRC, were also available during the event to provide information on Navy Medicine's research efforts and answer attendees' questions on current research efforts.

The primary objective of the Navy Malaria Program is to develop a vaccine that kills the malaria parasite during its first few days of development in the liver, before it breaks out into the blood. The program is also investigating vaccines that would target blood-stage infection to limit the severity of symptoms associated with this stage. A highly effective vaccine against this deadly parasitic infection would safe-

guard the warfighter, preserve mission integrity, and immensely benefit public health throughout malaria-endemic areas of the world.

Over the past 30 years, Navy Medicine researchers have worked in collaboration with national and international partners to develop a malaria vaccine. They are working jointly with the Army in the U.S. Military Malaria Vaccine Program.

Other highlights during the event included remarks by Sen. Chris Coons (D-DE), Sen. John Boozman (R-AR), and Rep. Gregory Meeks (D-NY), showing bipartisan support for global efforts to combat malaria.

NMRC, consisting of a network of laboratories throughout the United States and around the world, is committed to creating value for Sea Enterprise and the Navy and Marine Corps team by improving readiness and enhancing future capabilities in the areas of infectious diseases, biological de-

fense, military operational medicine, combat casualty care, and radiation research, all in support of Navy, Marine Corps, and joint U.S. warfighters.



Cmdr. Cindy Tamminga (left), NMRC malaria researcher, discusses progress on a malaria vaccine with Karen A. Gorlaeski, executive director, American Society of Tropical Medicine and Hygiene. Photo by Doris Ryan.

Greetings from the NMRC Ombudsman!

Springtime is here, and with it comes change. The weather is warming here in the D.C. area. Flowers are blooming and, if you're someone who suffers from allergies, the sneezing tells you that pollen levels are up as well. For those with school-age children, summer is right around the corner. You've probably begun penciling events onto your calendar, events like "summer vacation," "Mom's visit," or "kids' soccer camp."

Although spring and summer are often thought of as seasons for play and enjoyment, the additional planning required to get your child to that Tee-ball game or for that trip to your parents' house can be stressful. All families deal with this kind of stress. However, not all families are faced with the additional stress that is sometimes placed upon military families such as the prospect of deployment or an upcoming PCS.

There are a few things that we can all do to better manage stress. For one, see to it that you are getting sufficient sleep. Aim to get 6-8 hours of sleep a night. Cutting back on alcohol and caffeine can help. Try setting a bedtime routine and stick to it. Exercise can be a great stress reliever too. If exercise is new to you, even a 20-minute walk after dinner is a good start! Incorporate exercise into your daily schedule and make it a habit!

Of course, a better night's sleep or more exercise isn't always sufficient to reduce one's stress to acceptable levels. If stress is putting you in an unmanageable state or interfering with your social and/or work life, seek professional help. Recognizing the additional stress that military families can sometimes face, the Navy takes the mental health of our sailors and their families very seriously. Support systems are in place to help you manage life's stresses. I for one, as the NMRC Ombudsman, am available to assist you in finding the resources you need to better manage stress in your life. The Navy's Fleet and Family Readiness Office also offers counseling to assist you in maneuvering life's challenges. For the counseling services offered in Bethesda, please visit <http://www.cnrc.navy.mil/Bethesda/FleetAndFamilyReadiness/SupportServices/CounselingAndAssistance/index.htm>

Just remember, stress is natural — not all bad — but it can come at you when you least expect it and from all angles. Know that the Navy has the resources in place to help you fight it.

Finally, for the mothers reading this, I hope you have a wonderful Mother's Day!

As always, if you are in search of other resources or assistance, please don't hesitate to contact me. I can be reached by phone at (301) 233-9789 or by email at NMRC.Ombudsman@gmail.com.

Have a Fine Navy Day!
Alexandra Mora, NMRC Ombudsman